

CLAIMS

1. A circuit board having a flat plate shaped first board part and a flat plate shaped second board part disposed stacked on a partial region of this first board part, said
5 circuit board characterized in that

said first board part and said second board part each comprise a substrate formed in a flat plate shape, a plurality of interconnection patterns arranged inside said substrate so as to form a plurality of layers in its thickness direction,
10 and a plurality of interlayer connection parts disposed inside said substrate for connecting interconnection patterns belonging to different layers,

at least one of the substrate of said first board part and the substrate of said second board part is made of a
15 thermoplastic resin,

said first board part and said second board part are joined at their stacked regions by the thermoplastic resin being melted and then rehardened,

a plurality of first interconnection patterns are disposed
20 on said stacked region of said first board part,

a plurality of second interconnection patterns are disposed on said stacked region of said second board part so as to form pairs with said plurality of first interconnection patterns, and

25 between the pairs of said first interconnection patterns and said second interconnection patterns, interboard connection parts are formed from a connection material which at a temperature

applied to melt the thermoplastic resin melts at least partially and electrically connects the first and second interconnection patterns together.

2. A circuit board according to claim 1, characterized
5 in that a part of said second board part is stacked on said first board part.

3. A circuit board according to claim 1, characterized in that said second board part is more pliable than said first board part.

10 4. A circuit board according to claim 1, characterized in that the substrate of said first board part and the substrate of said second board part are each made of a thermoplastic resin.

15 5. A circuit board according to claim 4, characterized in that the substrate of said first board part and the substrate of said second board part are made of an identical thermoplastic resin.

20 6. A circuit board according to claim 1, characterized in that of said first board part and said second board part, said interlayer connection parts of the board part having a thermoplastic resin as its substrate and said interboard connection parts are made from the same connection material.

25 7. A circuit board according to claim 6, characterized in that said connection material includes tin and silver as main components.

8. A circuit board according to claim 6, characterized in that, of said first board part and said second board part,

the interboard connection parts belong to the board part having a thermoplastic resin as its substrate.

9. A circuit board according to claim 1, characterized in that, of said first board part and said second board part,
5 the interlayer connection parts of the board part having a thermoplastic resin as its substrate and the interboard connection parts are made from different connection materials.

10. A circuit board according to claim 9, characterized in that said interlayer connection parts are made from a
10 connection material including tin and silver as main components and said interboard connection parts are made from a connection material including a solder or conducting paste of any one of a tin-lead family, tin-silver family and tin-copper family.

11. A circuit board according to claim 1, characterized
15 in that said first and second interconnection patterns are arranged so as to form at least two rows.

12. A circuit board according to claim 1, characterized in that of said first board part and said second board part, the board part having a thermoplastic resin as its substrate
20 has the stacked region and a non-stacked region which is not stacked on the other board part, and in the stacked region a trace resulting from a greater number of meltings and rehardenings than the non-stacked region is left.

13. A circuit board according to claim 12, characterized
25 in that as said trace, a mark resulting from pressing said thermoplastic resin remains in said stacked region.

14. A circuit board connection structure for connecting,

a first circuit board in which a thermoplastic resin is used as an insulating material to a second circuit board serving as a mother board, characterized in that

5 said first circuit board has a multilayer structure wherein insulating layers made from a thermoplastic resin and interconnection layers are stacked alternately and to electrically connect adjacent interconnection layers together an interlayer connection material is disposed in said insulating layers,

10 in an insulating layer constituting a connection face of said first circuit board to be connected to said second circuit board, via holes reaching the inner interconnection layers are formed, and these via holes are filled with a connection material,

15 said second circuit board has a multilayer structure wherein insulating layers and interconnection layers are stacked alternately and an interlayer connection material for electrically connecting adjacent interconnection layers together is disposed in said insulating layers,

20 at least lands serving as connection terminals are formed on a connection face of said second circuit board, and inner interconnection layers are used for interconnecting to those lands, and

25 said first circuit board is connected to said second circuit board by said connection material of the first circuit board being electrically connected to the lands of said second circuit board and the insulating layer constituting the

connection face of said first circuit board being adhered to the connection face of said second circuit board by thermal welding.

15. A circuit board connection structure according to
5 claim 14, characterized in that when the insulating layers of said second circuit board are made from a thermoplastic resin, as the thermoplastic resin constituting the insulating layers of the first board, a thermoplastic resin material having a lower melting point than the thermoplastic resin constituting
10 the insulating layers of said second circuit board is used.

16. A circuit board connection structure according to claim 14, characterized in that said connection material includes at least a tin component and a metal component with a higher melting point than the tin component, and is electrically
15 connected to the lands of said second circuit board by the tin component diffusing into the lands.

17. A circuit board connection structure according to claim 14, characterized in that after the insulating layers and the interconnection layers of said first circuit board
20 are stacked, via holes are formed so as to reach said inner interconnection layers and said connection material is filled into those via holes.

18. A circuit board connection structure according to claim 17, characterized in that said connection material includes
25 a solder or conducting paste of any one of a tin-lead family, tin-silver family and tin-copper family.

19. A circuit board connection structure according to

claim 14, characterized in that said lands are arranged two-dimensionally on the connection face of said second circuit board.

20. A circuit board connection structure according to
5 claim 14, characterized in that a surface roughening treatment is carried out on at least one of the connection faces of said first circuit board and said second circuit board, to increase bonding strength.

21. A circuit board connection structure according to
10 claim 20, characterized in that said surface roughening treatment is carried out by irradiating the connection face with ultraviolet (UV) light.

22. A circuit board connection structure for connecting
a first circuit board in which a thermoplastic resin is used
15 as an insulating material to a second circuit board serving as a mother board, characterized in that

said first circuit board has a multilayer structure wherein
insulating layers made from a thermoplastic resin and
interconnection layers are stacked alternately and to
20 electrically connect adjacent interconnection layers together
an interlayer connection material is disposed in said insulating
layers,

on an insulating layer surface constituting a connection
face of said first circuit board to be connected to the second
25 circuit board, at least first lands are formed as connection
terminals, and the inner interconnection layers are used for
interconnecting to that first lands,

said second circuit board has a multilayer structure wherein insulating layers and interconnection layers are stacked alternately and an interlayer connection material for connecting adjacent interconnection layers together is disposed in said
5 insulating layers,

second lands to serve as connection terminals forming pairs with said first lands are formed on the connection face of said second circuit board and the inner interconnection layers are used for interconnecting to said second lands, and

10 said first circuit board is connected to said second circuit board by the both lands being electrically connected by a land connection material formed on at least one of the first lands and the second lands and the insulating layer constituting the connection face of said first circuit board
15 being bonded to the connection face of said second circuit board by thermal welding.

23. A circuit board connection structure according to claim 22, characterized in that when the insulating layers of said second circuit board are made from a thermoplastic resin, as the thermoplastic resin constituting the insulating
20 layers of said first board, a thermoplastic resin material having a lower melting point than the thermoplastic resin constituting the insulating layers of said second circuit board is used.

25 24. A circuit board connection structure according to claim 22, characterized in that said connection material includes at least a tin component and a metal component with a higher

melting point than the tin component, and is electrically connected to the first and second lands of said first and second circuit boards by the tin component diffusing into said first and second lands.

5 25. A circuit board connection structure according to claim 24, characterized in that said connection material includes a solder or conducting paste of any one of a tin-lead family, tin-silver family and tin-copper family.

10 26. A circuit board connection structure according to claim 22, characterized in that said first and second lands are arranged two-dimensionally on the connection faces of said first and second circuit boards.

15 27. A circuit board connection structure according to claim 22, characterized in that a surface roughening treatment is carried out on at least one of the connection faces of said first circuit board and the second circuit board, to increase bonding strength.

20 28. A circuit board connection structure according to claim 27, characterized in that said surface roughening treatment is carried out by irradiating the connection face with ultraviolet (UV) light.